RF Exposure Report

Report No.:	SA181019C22
Test Model:	NCA-1515A
Series Model:	NCA-1515xxxxxxx, LUNA-D200xxxxxxx (Where x can be 0-9, A-Z, a-z, any alphanumeric character or blank)
Received Date:	Oct. 19, 2018
Test Date:	Nov. 17 ~ Nov. 23, 2018
Issued Date:	Nov. 30, 2018
Applicant:	Compex Systems Pte Ltd
Address:	No. 9 Harrison Road, Harrison Industrial Building #05-01, Singapore 369651
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration/ Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
SA181019C22	Original release	Nov. 30, 2018

1 Certificate of Conformity

Product:	Network Appliance Platform
Brand:	Lanner
Test Model:	NCA-1515A
Series Model:	NCA-1515xxxxxxx, LUNA-D200xxxxxxx (Where x can be 0-9, A-Z, a-z, any alphanumeric character or blank)
Sample Status:	Engineering sample
Applicant:	Compex Systems Pte Ltd
Test Date:	Nov. 17 ~ Nov. 23, 2018
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Nov. 30, 2018

Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Nov. 30, 2018

Bruce Chen / Project Engineer

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

f = Frequency in MHz; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

pi = 3.1416

r = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Tune up Power

For WLAN: (Base on WLAN module report (Model: AP6356SDPB, FCC ID: ZQ6-AP6356SDXX))

Frequency Band (MHz)	TX Funtion	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN: 2.4GHz Band	1TX	14.15	1.60	20	0.007	1
	2TX	14.91	4.61	20	0.018	1
WLAN: 5GHz Band	2TX	12.84	4.95	20	0.012	1

Note:

2.4GHz: Directional gain = 1.60dBi + 10log(2) = 4.61dBi

5GHz: Directional gain = 1.94dBi + 10log(2) = 4.95dBi

For WLAN: (Base on WLAN module report (Model: WLE600VX, FCC ID: TK4WLE600VX))

Frequency Band (MHz)	TX Funtion	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN: 2.4GHz Band	1TX	22.26	1.60	20	0.048	1
	2TX	24.22	4.61	20	0.152	1
WLAN: 5GHz Band	1TX	21.89	1.94	20	0.048	1
	2TX	24.63	4.95	20	0.181	1

Note:

2.4GHz: Directional gain = 1.60dBi + 10log(2) = 4.61dBi

5GHz: Directional gain = 1.94dBi + 10log(2) = 4.95dBi

For WWAN: (Base on WWAN module report (Model: EM7455, FCC ID: N7NEM7455))

Function	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 2	1852.4-1907.6	23.64	1.56	20	0.066	1
WCDMA Band 4	1712.4-1752.6	23.45	1.62	20	0.064	1
WCDMA Band 5	826.4-846.6	23.51	3.20	20	0.093	0.550
LTE Band 4	1720.0-1745.0	23.99	1.62	20	0.072	1
LTE Band 7	2502.5-2567.5	22.93	0.44	20	0.043	1
LTE Band 12	699.7-715.3	23.99	1.49	20	0.070	0.466
LTE Band 13	779.5-784.5	23.93	1.66	20	0.072	0.521
LTE Band 25	1850.7-1914.3	23.99	1.56	20	0.071	1
LTE Band 26	814.7-848.3	23.98	3.20	20	0.104	0.546
LTE Band 30	2307.5-2312.5	22.95	2.27	20	0.066	1
LTE Band 41	2498.5-2687.5	22.92	0.44	20	0.043	1

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

1. WLAN 2.4G (Module: WLE600VX) + WLAN 5G (Module: AP6356SDPB) + WWAN LTE Band 4 (Module: EM7455) = 0.152 / 1 + 0.012 / 1 + 0.072 / 1 = 0.236
2. WLAN 2.4G (Module: AP6356SDPB) + WLAN 5G (Module: WLE600VX) + WWAN LTE Band 4 (Module: EM7455) = 0.018 / 1 + 0.181 / 1 + 0.072 / 1 = 0.271
3. WLAN 2.4G (Module: WLE600VX) + WLAN 5G (Module: AP6356SDPB) + WWAN LTE Band 25 (Module: EM7455) = 0.152 / 1 + 0.012 / 1 +0.071 / 1 = 0.235
4. WLAN 2.4G (Module: AP6356SDPB) + WLAN 5G (Module: WLE600VX) + WWAN LTE Band 25 (Module: EM7455) = 0.018 / 1 + 0.181 / 1 + 0.071 / 1 = 0.270
5. WLAN 2.4G (Module: WLE600VX) + WLAN 5G (Module: AP6356SDPB) + WWAN LTE Band 26 (Module: EM7455) = 0.152 / 1 + 0.012 / 1 + 0.104 / 0.546 = 0.354
6. WLAN 2.4G (Module: AP6356SDPB) + WLAN 5G (Module: WLE600VX) + WWAN LTE Band 26 (Module: EM7455) = 0.018 / 1 + 0.181 / 1 + 0.104 / 0.546 = 0.389

Therefore the maximum calculations of above situations are less than the “1” limit.

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